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Effect of the sporadic E layer on propagation of metric and decametric radiowaves on short paths

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Abstract

The effect of the sporadic Es layer on radiowave propagation is established on the basis of studies carried out on the short midlatitude path Moscow-Kazan in a wide frequency range by simultaneous sounding at a sliding frequency and several fixed frequencies. The signal mode composition and probability distributions of the signal mean amplitudes were analyzed. Three frequency ranges with different Es layer influences on the radiocommunication character were revealed. First, the range of usable frequencies is significantly expanded due to the presence of the Es layer with enhanced electron density. The limits of this range as a function of the threshold level of the radiolink are presented in this work. Second, the radiocommunication quality in the middle part of the usable frequency range is shown to get worse due to multiple rays caused by the appearance of Es signals and reflections from the regular ionosphere. Third, the radiocommunication quality in the lower part of the range is improved when multiple rays disappear due to shielding of the signals reflected from the F2 layer by the Es layer.